IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| In re application of:<br>Joseph H. Lyons<br>Application No.: 10/646,720<br>Filed: August 25, 2003<br>For: **High-Resolution Gas Gauge Proximity Sensor** | Confirmation No.: 9846<br>Art Unit: 2855<br>Examiner: Michael T. Cygan<br>Atty. Docket: 1857.2030000 |

# Brief on Appeal Under 37 C.F.R. § 41.37

***Mail Stop Appeal Brief - Patents***

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

A Notice of Appeal from the final rejections of claims 19-25 and 39-52[1] was filed on April 13, 2006. Appellants hereby file one copy of this Appeal Brief, together with the required fee set forth in 37 C.F.R. § 41.20(b)(2).

It is not believed that extensions of time are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to our Deposit Account No. 19-0036.



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[1] Claims 39-52 are finally rejected for the same reasons as identical cancelled claims 1-14.

## Table of Contents

## *I. Real Party In Interest (37 C.F.R. § 41.37(c)(1)(i))*

The real party in interest in this appeal is ASML Holding N.V., having its principal place of business at De Run 6501, NL - 5504 DR, Veldhoven, The Netherlands. An assignment assigning all right, title and interest in and to the above-captioned patent application from the inventor Joseph H. Lyons to ASML Holding N.V. was recorded in the U.S. Patent & Trademark Office (USPTO) on August 25, 2003 at Reel 014430, Frame 0552.

## *II. Related Appeals and Interferences (37 C.F.R. § 41.37(c)(1)(ii))*

Appellant, including the undersigned legal representative and the assignee of the above-captioned application, are aware of no pending appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board of Patent Appeals and Interferences ("the Board") in the pending appeal.

## *III. Status of Claims (37 C.F.R. § 41.37(c)(1)(iii))*

The Application was filed on August 25, 2003 and was assigned U.S. Application No. 10/646,720 ("the '720 application"). The '720 application originally included claims 1-18. The Examiner mailed an Office Action rejecting claims 1-18 on December 4, 2004. In an Amendment and Reply filed February 8, 2005, Appellant amended Claims 1, 2, 6, 8, 9, 13, 15, 17, and 18. A final Office Action rejecting claims 1-18 was mailed April 14, 2005.

Appellant filed a Request for Continuing Examination ("RCE") on June 28, 2005. In the RCE, Appellant cancelled claims 1-18 and added new claims 19-24. An Office Action rejecting claims 19-24 was mailed August 3, 2005. In an Amendment and Reply filed November 3, 2005, Appellant amended claims 19 and 21-24 and added new claims 25-38. A final Office Action was mailed December 13, 2005. In the final Office Action, the Examiner restricted out claims 26-38 as being non-elected by original presentation and rejected claims 19-25.

In an after final Amendment and Reply filed March 1, 2006, Appellant presented arguments against both the restriction and the rejections. An Advisory Action was mailed April 4, 2006, in which the Examiner stated if claims identical to finally rejected and cancelled claims 1-14 were reintroduced into the application they would be entered for purposes of appeal, but that claims 26-38 would not be available for appeal. The Examiner also upheld the final rejection of claims 19-25.

In a second after final Amendment and Reply filed June 8, 2006, Appellant cancelled claims 26-38 and submitted new claims 39-52, which were identical to previously rejected and cancelled claims 1-14. An Advisory Action was mailed June 21, 2006, in which the Examiner entered claims 39-52 and established they were finally rejected for the same reasons cancelled claims 1-14 were finally rejected in the April 14, 2005.

Claims 19-25 and 39-52 are on appeal. A copy of the claims on appeal can be found in the attached Claims Appendix.

## *IV. Status of Amendments (37 C.F.R. § 41.37(c)(1)(iv))*

All amendments have been entered, and claims 19-25 and 39-52 are pending.

In an Amendment and Reply filed November 3, 2005, Appellant amended claims 19 and 21-24 and added new claim 25. These claims were entered and finally rejected in an Office Action dated December 13, 2005.

Subsequent to the final Office Action dated December 13, 2005, claims 26-38 were cancelled and new claims 39-52 were added. The Examiner entered new claims 39-52 in the Advisory Action mailed June 21, 2006.

## *V. Summary of Claimed Subject Matter (37 C.F.R. § 41.37(c)(1)(v))*

FIG. 1 (reproduced below) illustrates a gas gauge proximity sensor 100. (See paragraph 0024). Gas gauge proximity sensor 100 includes a mass flow controller 106, a central channel 112, a measurement channel 116, a reference channel 118, a measurement channel restrictor 120, a reference channel restrictor 122, a measurement probe 128, a reference probe 130, a bridge channel 136, and a mass flow sensor 138. (*Id.*). A gas supply 102 injects gas at a desired pressure into gas gauge proximity sensor 100. (*Id.*).

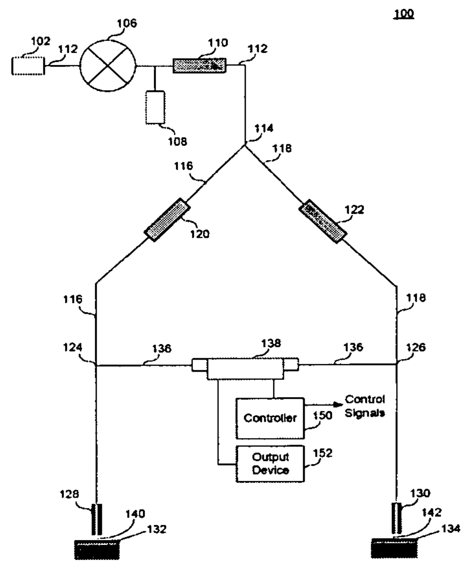


FIG. 1

Central channel 112 connects gas supply 102 to mass flow controller 106 and then terminates at a junction 114 (*e.g.*, a gas dividing or directing portion). (See paragraph 0025). Gas is forced out from mass flow controller 106 through a porous snubber 110, with an accumulator 108 affixed to channel 112. (*Id.*). Upon exiting snubber 110, gas travels through central channel 112, which terminates at junction 114 and divides into measurement channel 116 and reference channel 118. (*Id.*). A bridge channel 136 is coupled between measurement channel 116 and reference channel 118 connecting to measurement channel 116 at junction 124 and to reference channel 118 at junction 126. (See paragraph 0026).

Reference channel 118 terminates adjacent a reference probe 130 positioned above a reference surface 134. (See paragraph 0028). Likewise, measurement channel 116 terminates adjacent a measurement probe 128 positioned above a measurement

surface 132. (*Id.*). Nozzles are provided in measurement probe 128 and reference probe 130. (See paragraph 0029). Gas injected by gas supply 102 is emitted from nozzles in probes 128 and 130, and impinges upon measurement surface 132 and reference surface 134. (*Id.*).

The distance between a nozzle and a corresponding measurement or reference surface is referred to as a standoff. (See paragraph 0030). Reference probe 130 is positioned above a fixed reference surface 134 with a known reference standoff 142. (See paragraph 0031). Measurement probe 128 is positioned above measurement surface 132 with an unknown measurement standoff 140. (*Id.*). If standoffs 140 and 142 are equal, the configuration is symmetrical and the bridge is balanced. (See paragraph 0032). Consequently, there is no gas flow through bridging channel 136. (*Id.*). On the other hand, when the measurement standoff 140 and reference standoff 142 are different, the resulting pressure difference between the measurement channel 116 and the reference channel 118 induces a flow of gas through mass flow sensor 138. (*Id.*).

Mass flow sensor 138 is located along bridge channel 136, which can be at a central point. (See paragraph 0033). Mass flow sensor 138 senses gas flow induced by pressure differences between measurement channel 116 and reference channel 118. (*Id.*). These pressure differences occur as a result of changes in the vertical positioning of measurement surface 132. (*Id.*). Mass flow sensor 138 senses gas flow induced by a pressure difference or imbalance. (See paragraph 35). A pressure difference causes a gas flow, the rate of which is a unique function of the measurement standoff 140. (*Id.*). In other words, assuming a constant flow rate into gas gauge 100, the difference between gas pressures in the measurement channel 116 and the reference channel 118 is a function of the difference between the magnitudes of standoffs 140 and 142. (*Id.*). If reference standoff 142 is set to a known standoff, the difference between gas pressures in the measurement channel 116 and the reference channel 118 is a function of the size of measurement standoff 140 (that is, the unknown standoff in the z direction between measurement surface 132 and measurement probe 128). (*Id.*).

Mass flow sensor 138 detects gas flow in either direction through bridge channel 136. (See paragraph 35). Because of the bridge configuration, gas flow occurs through bridge channel 136 only when pressure differences between channels 116 and 118 occur. (*Id.*). When a pressure imbalance exists, mass flow sensor 138 detects a resulting gas

flow. (*Id.*). Mass flow sensor 138 initiates an appropriate control function, which can be done using optional controller 150 that is coupled to appropriate parts of system 100. (*Id.*). Mass flow sensor 138 provides an indication of a sensed flow through a visual display or audio indication, which is done through use of optional output device 152. (*Id.*).

Figures 3 and 4 (reproduced below) show a cross-sectional and end view of a nozzle 350, respectively, and characteristics thereof. Nozzle 350 can be used in conjunction with measurement probe 128 and reference probe 130. (See paragraph 0046). The basic configuration of a gas gauge nozzle 350 is characterized by a flat end surface 351 that is parallel to measurement surface 132 or reference surface 134. (*Id.*).

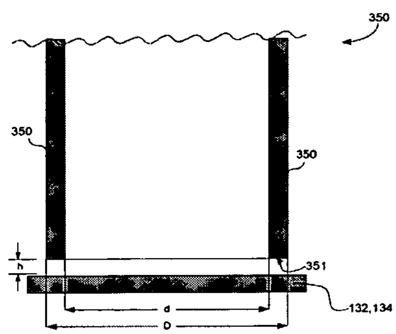


FIG. 3

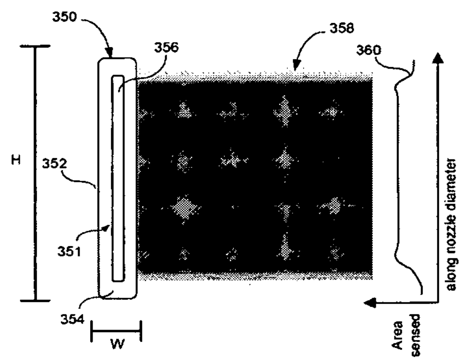


FIG. 4

As seen in FIG. 4, nozzle 350 can be elongated along section 352 having height H and shorter along section 354 having a width W, as compared to a conventional nozzle 600 shown in FIG. 6 (reproduced below). (See paragraph 0049). For example, in one embodiment a ratio of H to W can be about 2:1 to about 20:1. (*Id.*). This can produce a long thin like orifice shape that is more efficient than a conventional circular nozzle shape to perform topography measurements. (*Id.*). Also, low sensitivity area 602 in FIG. 6 can be substantially eliminated because side restriction regions overlap, as seen by sensed area 358 and graph 360, which includes substantially no low sensitivity area. (*Id.*). Referring to Figure 4, sensed area 358 can be a "scanned" footprint based on several successive readings. (*Id.*). Graph 360 shows an area sensed along a diameter of nozzle 350. (*Id.*). Thus, during a topography scan, a more uniform sensitivity footprint is produced, as discussed below. (*Id.*). This yields a more accurate topographic

measurement. (*Id.*). This measurement can be simpler to compare with other sensor types, as described above. (*Id.*). When used as a scanning device, nozzle 350 can cover a greater area of topography in a single scan because of its greater height profile. (*Id.*).

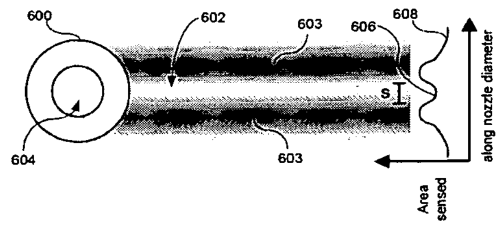


FIG. 6

In order to produce a more uniform sensitivity footprint, a width W of the nozzle 350 can be reduced by a factor of about 10% compared to nozzle 600 in FIG. 6, a height H can be increased by a factor of about 250% * PI ($\pi$), while maintaining a same surface area. (See paragraph 0051). With only 10% of the width compared to circular nozzles, the dead area is greatly minimized as the side restriction regions (which are not labeled because they are no long distinguishable based on orifice configuration) overlap, as is best seen comparing curve 358 in FIG. 4 and curve 602 in FIG. 6. (*Id.*). With the height H increase of roughly 800%, when used as a scanning device, nozzle 350 can cover a greater area of topography in a single scan. (*Id.*). All topography scanned would convolute with a more uniform sensitivity footprint. (*Id.*).

## *VI. Grounds of Rejection to be Reviewed on Appeal (37 C.F.R. § 41.37(c)(1)(vi))*

A concise statement listing each ground of rejection presented for review follows.

### *A. Ground 1*

Claims 19-24 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,953,388 to Barada ("Barada") in view of U.S. Patent No. 4,604,892 to Carreras ("Carreras").

### *B. Ground 2*

Claims 19-24 were rejected under 35 U.S.C. §103(a) as being unpatentable over Barada in view of in view of U.S. Patent No. 3,948,082 to Zumbach ("Zumbach").

### *C. Ground 3*

Claim 25 was rejected under 35 U.S.C. §103(a) as being unpatentable over Barada in view of Carreras in further view of U.S. Patent No. 5,317,898 to Nemeth ("Nemeth").

### *D. Ground 4*

Claim 25 was rejected under 35 U.S.C. §103(a) as being unpatentable over Barada in view Zumbach in further view of Nemeth.

*E. Ground 5*

It is believed that claims 39-52 are rejected under 35 U.S.C. §103(a) as being unpatentable over Barada in view of Carreras, as set forth in the Final Office Action of April 14, 2005, that was based on identical now cancelled claims 1-14.

*F. Ground 6*

It is believed that claims 39-52 are rejected under 35 U.S.C. §103(a) as being unpatentable over Barada in view of Zumbach, as set forth in the Final Office Action of April 14, 2005, that was based on identical now cancelled claims 1-14.

## *VII. Argument (37 C.F.R. § 41.37(c)(1)(vii))*

### *A. Rejection of claims 19-24 and 39-52 under 35 U.S.C. § 103(a) over Barada in view of Carreras, or in the alternative, in view of Zumbach*

In the final Office Action of December 13, 2005, Claims 19-24 were rejected under 35 U.S.C. §103(a) as being unpatentable over Barada in view of Carreras, or in the alternative, in view of Zumbach. In the final Office Action of April 14, 2005, cancelled claims 1-14, which are identical to pending claims 39-52, were rejected under 35 U.S.C. §103(a) as being unpatentable over Barada in view of Carreras, or in the alternative, in view of Zumbach.

### *1. The Obviousness Rejections with Respect to Claims 19-24 and 39-52 are in Error and Must be Reversed*

#### *a) Distinguishing Features in Claims 19, 39, and 46*

Claim 19 recites features that distinguish over the applied references. For example, Claim 19 recites:

> A method, comprising:
>
> ...
>
> scanning the first probe over a reference surface to produce successive reference values, such that a size of an opening of the elongated nozzle allows for an entire area of the reference surface adjacent the first probe during the scanning to be measured by substantially eliminating low sensitivity areas;
>
> scanning the second probe over a measured surface to produce successive measured values, such that a size of an opening of the elongated nozzle allows for an entire area of the measured surface adjacent the second probe during the scanning to be measured by substantially eliminating low sensitivity areas; and
>
> ... .

Claim 39 recites features that distinguish over the applied references. For example, claim 39 recites "probes located at adjacent ends of the reference channel and the measurement channel and having an elongated nozzle orifice."

Claim 46 recites features that distinguish over the applied references. For example, claim 46 recites "probes respectively coupled to adjacent ends of the reference channel and the measurement channel, the probes including elongated nozzle orifices."

None of the applied references, either alone or in an alleged obvious combination, even assuming they are analogous art, not applied using impermissible hindsight, and do not make Barada unsatisfactory for its intended purpose and/or change it's principle of operation, teach or suggest these distinguishing features. Therefore, the Examiner has failed to establish a *prima facie* case of obviousness for claims 19, 39, and 46.

### *b) Summary of Teachings in Applied References*

Barada teaches a conventional differential air gauge sensor. The Examiner has acknowledged this reference lacks any teaching or suggestion of having an elongated nozzle associated with each of its probes. (See, e.g., final Office Action mailed December 13, 2005, pages 4 and 5).

Zumbach is related to a method and device for contactless thickness measuring of insulation of a cable as it leaves an extruder. (See Column 1, lines 58-60). Zumbach teaches a thickness measuring device coupled to a differential air gauge sensor. (See Column 8; Fig. 7). The teaching of an alleged elongated slit 34 of a nozzle 16' of a measuring coil 18' in Zumbach is only directed to being used for thickness measuring using inductance measuring with coils, not being used within the differential air gauge sensor. (See column 8, lines 46-60; Figures 4 and 7). Thus, elongated slit 34 is unrelated to any distance measuring done using the differential air gauge sensor. *(Id.)*. Also, the differential air gauge sensor in Zumbach measures a distance only to determine where to position the thickness measuring device 18' that includes the elongated slit 34 of the nozzle 16'. *(Id.)*.

Carreras is related to an apparatus and process for contactless measuring of a volume of a layer of wet, electrically resistive material that is deposited on a rigid support substrate, the deposit having a known length and width. (See Abstract). For example Carreras is used in electrical circuit or silk screen printing environments. (See column 1, lines 11-12 and column 2, lines 23-29). Carreras teaches of a single probe (*e.g.*, probes 5, 6, or 7) used to measure volume or thickness of a respective object (*e.g.*, 2, 3, or 4) on a substrate. (See column 4; Figure 1). An end of the probe in Carreras is shaped to conform to the shape of the object on the substrate being measured. (*Id.*). The thickness of a material deposited on a substrate is measured by determining a difference between first and second measurements taken at different times, *i.e.*, before and after deposit of a material on substrate. (See columns 4-6). Thus, there is a single elongated probe having no specific shape taught in Carreras since the shape is determined based on the shape of what respective object is being measured. Also, it appears Carreras is unrelated to a differential air gauge sensor.

### *c) Neither Zumbach Nor Carreras Are Analogous Art To The Claimed Invention Pursuant To M.P.E.P. §2141.01(a)*

Neither Zumbach nor Carreras are analogous art to the claimed invention pursuant to M.P.E.P. §2141.01(a), which requires an applied reference to either: (a) be in a field of the endeavor; or (b) reasonably pertinent to the particular problem with which the inventor was concerned. Zumbach and Carreras fail both prongs of the test.

It appears the Examiner has misconstrued the law regarding the "field of endeavor" prong of the non-analogous art test. The Federal Circuit clarified this prong of the test for non-analogous art in *In re Bigio*. *In re Bigio*, 381 F.3d 1320 (Fed. Cir. 2004). In *In re Bigio* the Federal Circuit emphasized that the tests regarding non-analogous art must take into consideration the claimed invention, and not just what the applicant described in the specification. For example, the Federal Circuit stated "The Board thus correctly set the field of invention by consulting the structure and function of **the claimed invention** as perceived by one of ordinary skill in the art." *Id.* at 1326 (emphasis added). The Federal Circuit also stated "the Board referred to the structure and function of **the claimed invention** in the application. The Board further assessed the field that one of skill in this art would consider within the same endeavor as **the claimed invention**." *Id.* at 1327 (emphasis added).

Neither of these applied references teaches or suggests of using an elongated nozzle in a gas gauge sensor and/or using an elongated nozzle to make measurements in a similar way as a differential gas gauge sensor, as respectively recited in claims 19, 39, and 46. In contrast, an elongated slit 34 of a nozzle 16' of a measuring coil in Zumbach is only directed to being used for thickness measuring using inductance measuring with coils. Also, Zumbach is measuring the thickness of insulation of a cable leaving an extruder. Also, in Carreras the thickness of a respective material deposited on a substrate is measured using a single nozzle per material location by determining a difference between first and second measurements taken at different times, i.e., before and after deposit of a material on substrate. Also, Carreras is measuring the volume of a layer of wet, electrically resistive material having a known width and length. Therefore, neither Zumbach nor Carreras is analogous art to the claimed invention because neither is in the same field of endeavor, e.g., using a differential air gauge to measure a distance from an end of a reference and measuring channel.

It appears the Examiner has misconstrued the law regarding the "reasonably pertinent to the particular problem" prong of the non-analogous art test. In regards to this prong, the Federal Circuit in *In re Clay* stated "If a reference disclosure has the same purpose as **the claimed invention** the reference relates to the same problem... ." *In re Clay*, 966 F.2d 656, 659 (Fed Cir. 1992) (emphasis added). The Federal Circuit also stated in *In re Clay* "the purposes of both the invention and the prior art are important in determining whether the reference is reasonably pertinent to the problem the invention attempts to solve." *Id.* at 659. The Federal Circuit further stated in *In re Clay* "A reference is reasonable pertinent if...it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem." *Id.*

The claimed invention is directed to making nanometer level measurements of standoffs between respective measuring and reference nozzles and measurement and reference surfaces using a differential air gauge sensor having an elongated nozzle. The elongated nozzle of the claimed invention is used to substantially eliminate or reduce low sensitivity areas that can cause problems with such small measuring tolerances. Neither Zumbach nor Carreras are concerned with solving this problem, as they both relate to measuring objects have much larger dimensions and do not measuring using a differential air gauge sensor, as discussed above. Therefore, neither Zumbach nor Carreras is analogous art to the claimed invention because neither is pertinent to the problem being solved by the claimed invention.

Therefore, because Zumbach and Carreras are non-analogous art to the claimed invention, no *prima facie* case of obviousness has been established.

#### *d) The Examiner Has Used Impermissible Hindsight*

Even assuming Zumbach and/or Carreras are analogous art, the Examiner has used impermissible hindsight to combine nozzles from different types of measuring systems in Zumbach and Carreras to the probes of Barada's differential air gauge sensor, which is not permitted under the prevailing patent laws. *Continental Can Company v. Monsanto Company*, 948 F.2d 1264, 1271, 20 USPQ2d 1746, 1751 (Fed. Cir. 1991) ("When prior art references require selective combination ... there must be some reason for the combination other than the hindsight gleaned from the invention itself."); *Heidelberger Druckmaschinen AG v. Hantscho Commercial Products, Inc.*, 21 F.3d

1068, 1072 30 USPQ2d 1377,1380 (Fed. Cir. 1993) ("The motivation to combine references can not come from the invention itself."); *Para-Ordnance Manufacturing, Inc. v. SGS Importers International, Inc.*, 73 F.3d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995) ("Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor."). For example, a skilled artisan would not look to the nozzles of Zumbach or Carreras, which related to electrical measuring, when trying to resolve problems in differential air gauge measuring.

It also appears the Examiner may have used the impermissible "would have been able to produce" standard. *See, e.g., Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565 (Fed. Cir. 1986) (stating the statute at Section 103 requires much more than the references would have been able to produce the claimed features, rather the statute requires it would have been obvious to produce the claimed invention without the benefit of hindsight).

Therefore, because Barada and either Zumbach or Carreras cannot be combined without impermissible hindsight, no *prima facie* case of obviousness has been established.

***e) The Applied References Do Not Solve the Problem Presented by the Inventor***

Neither Zumbach nor Carreras attempt to solve the same problem as the claimed invention. The claimed invention, for example, overcomes a sensitivity concern with some differential pressure measuring systems.

Moreover, neither Zumbach nor Carreras are used to teach or suggest "a size of an opening of the elongated nozzle allows for an entire area of the reference surface adjacent the first probe during the scanning to be measured by substantially eliminating low sensitivity areas," as recited in claim 19.

For example, this is described in an exemplary portion (*e.g.*, paragraphs 0006-0007) of the instant specification as follows:

> FIG. 6 shows an end view and characteristics of a circular gas gauge proximity sensor 600. One issue with proximity sensor 600 is that the sensitivity footprint, depending on the nozzle size and standoff, is often a torus like shape. Based on the torus shape, sensor 600 can have a region 602 of lesser sensitivity (see area 606 on graph 608) right under

> the orifice 604. This can be because side restriction regions 603 have a separation S. Sensed area 603 can be a "scanned" footprint based on several successive readings. Ideally, it is desirable to eliminate this lower sensitivity region 602 in the central portion of air gauge 600.
>
> One way to achieve this is to provide a dramatically smaller orifice, but this can result in a smaller sensing area and less standoff. Additionally, when used as a scanning device, the topography passing near the center of the device is not considered as important as the topography passing near the upper or lower shell. Additionally, it is often desirable to compare topography results between sensor types (optical, capacitate etc). The unusual sensitivity footprint of the standard air gauge complicates this process.

In regards to reducing sensitivity, an exemplary portion (*e.g.*, paragraph 0023) of the instant specification states:

> Using the elongated nozzle having the long and thin orifice substantially eliminates any low sensitivity areas found in conventional sensors (see FIG. 6, elements 602 and 606) partially because side restriction regions overlap (see FIG. 4, elements 356 and 360).

However, neither of the alleged elongated probes in Zumbach and Carreras teach or suggest this feature.

In contrast, Carreras is directed to making sure the probe matches a shape of a deposited resist, where it states (column 4, lines 47-58):

> The jets shown at 5, 6 and 7 according to their shapes allow, because they are homothetic with respect to the shapes of the resistances while remaining inscribed therewithin, all the variations of thickness of the deposit to be integrated for the flow of the air currents is directly related to the flow resistance per unit of length. Thus the jet 5 will have a square section if deposit 2 has a square section, but a circular section in this case also gives good results if the circle is inscribed within the square formed by the resistance. Jets 6 and 7 each have rectangular section, for the shape of resistances 3 and 4 are rectangular.

Zumbach fails to teach or suggest anything regarding what characteristics are associated with its probe 18'.

Therefore, the Examiner has failed to establish a *prima facie* case of obviousness in view of the applied references.

### *f) Trying to Incorporate the Nozzle of Either Zumbach or Carreras into Barada would make Barada Unsatisfactory For Its Intended Purpose And/Or Change It's Principle Of Operation*

Trying to incorporate the nozzle of either Zumbach or Carreras into Barada would make Barada's system unsatisfactory for its intended purpose and/or change it's principle of operation. See M.P.E.P § 2143.01(V) and (VI). Barada is a differential air gauge sensor having a measuring and reference channel with probes at the end of each channel that measure a standoff between the probe and a respective measuring and reference surface. As described above, Zumbach uses an inductance measuring sensor to measure the thickness of cable conduit. Also, as described above, Carreras uses a set of homeothetic probes to make first and second thickness measurements, while knowing a width and length of a wet object, to measure a volume of the wet object deposited on a substrate. Thus, neither of these nozzles of Zumbach or Carrera could be incorporated into the system of Barada without making Barada unsatisfactory for its intended purpose and/or changing it's principle of operation. Therefore, neither Zumbach or Carrera is properly combinable with Barada, so no *prima facie* case of obviousness has been established.

### *g) No Prima Facie Case for Obviousness Established*

Therefore, none of the applied references teach or suggest, either singly or in an obvious combination, probes including elongated nozzle orifices, nor do they teach of using the elongated nozzle orifices such that a size of an opening of the elongated nozzle allows for an entire area of the measured surface to be measured by substantially eliminating low sensitivity areas, as respectively recited in claims 19, 39, and 46. Therefore, no *prima facie* case for obvious has been established by the Examiner.

Accordingly, Appellant respectfully requests that the rejections be withdrawn and claims 19, 39, and 46 be found allowable over the applied references. Also, at least based on their respective dependencies to claims 19, 39, and 46, claims 20-24, 40-45, and 47-52 should be found allowable.

### *B. Rejection of claim 25 under 35 U.S.C. § 103(a) over Barada in view of Carreras in view of Nemeth, or in the alternative, Barada in view of Zumbach in view of Nemeth*

#### *1. The Obviousness Rejections with Respect to Claim 25 are in Error and Must be Reversed*

Claim 25 was rejected under 35 U.S.C. §103(a) as being unpatentable over Barada in view of Carreras in further view of Nemeth, or in the alternative, in view Barada in view Zumbach in further view of Nemeth.

Nemeth is not used by the Examiner to teach or suggest at least the distinguishing features discussed above with regard to claim 19, nor does it remedy the deficiencies of Barada, Zumbach, and Carreras, taken alone or in combination. Accordingly, Appellants respectfully request that the rejection of claim 25 be withdrawn for at least the same reasons as discussed above for claim 19, and that the claim be found allowable over the applied references.

### *C. Conclusion*

The subject matter of claims 19-25 and 39-52 is patentable over the applied references because the Examiner has failed to establish a *prima facie* case of obviousness. Therefore, Appellant respectfully requests that the Board reverse the Examiner's final rejections of these claims under 35 U.S.C. § 103(a) and remand this application for issue.

Respectfully submitted,

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Date: July 13, 2006

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## *VIII. Claims Appendix*

19. A method, comprising:

using first and second probes each having a respective elongated nozzle;

scanning the first probe over a reference surface to produce successive reference values, such that a size of an opening of the elongated nozzle allows for an entire area of the reference surface adjacent the first probe during the scanning to be measured by substantially eliminating low sensitivity areas;

scanning the second probe over a measured surface to produce successive measured values, such that a size of an opening of the elongated nozzle allows for an entire area of the measured surface adjacent the second probe during the scanning to be measured by substantially eliminating low sensitivity areas; and

determining a topography of the measured surface based on a difference between respective ones of the successive measured values and respective ones of the successive reference values.

20. The method of claim 19, further comprising:

producing a uniform sensitivity footprint based on the shape and size of the opening of the elongated nozzle.

21. The method of claim 19, further comprising:

using the respective elongated nozzles having a width to length ratio of about 2:1.

22. The method of claim 19, further comprising:

using the respective elongated nozzles having a width to length ratio of about 10:1.

23. The method of claim 19, further comprising:

using the respective elongated nozzles having a width to length ratio of about 20:1.

24. The method of claim 19, further comprising:

using the respective elongated nozzles having a width to length ratio of between about 2:1 to about 20:1.

25. The method of claim 19, further comprising:

using a flat metal plate on or adjacent a substrate stage that holds a substrate as the reference surface; and

using the substrate stage or the substrate as the measured surface.

39. A system, comprising:

means for directing a gas stream into a reference channel and a measurement channel;

means for evenly restricting gas flow through the reference channel and the measurement channel;

probes located at adjacent ends of the reference channel and the measurement channel and having an elongated nozzle orifice; and

means for sensing a mass of gas flow between the reference channel and the measurement channel.

40. The system of claim 39, further comprising:

a reference surface positioned a reference standoff from the reference probe, wherein a gas stream from the reference probe impinges on the reference surface after traveling across the reference standoff; and

a measurement surface positioned a measurement standoff from the measurement probe, wherein a gas stream from the measurement probe impinges on the measurement surface after traveling across the measurement standoff,

wherein the means for sensing senses a difference between the reference standoff and the measurement standoff.

41. The system of claim 39, further comprising:

means for controlling a mass flow rate of the gas stream positioned before the means for directing.

42. The system of claim 41, further comprising:

means for reducing gas turbulence positioned after the means for controlling.

43. The system of claim 39, wherein the nozzle orifice has a height H which is larger than a width W.

44. The system of claim 39, wherein:

the nozzle orifice has a height H and a width W; and

a ratio of H to W is between about 2:1 to about 20:1.

45. The system of claim 39, wherein:

the nozzle orifice has a height H and a width W; and

a ratio of H to W is about 10:1.

46. A gas gauge proximity sensor that is provided with a gas supply during operation, comprising:

a dividing portion that divides the supplied gas into a reference channel and a measurement channel;

flow restrictors placed in the reference channel and measurement channel; probes respectively coupled to adjacent ends of the reference channel and

the measurement channel, the probes including elongated nozzle orifices; and

a mass flow sensor coupled between the reference and measurement channels that senses the mass of gas flow therebetween.

47. The gas gauge proximity sensor of claim 46, further comprising:

a reference surface positioned a reference standoff from the reference probe, wherein a gas stream from the reference probe impinges on the reference surface after traveling across the reference standoff; and

a measurement surface positioned a measurement standoff from the measurement probe, wherein a gas stream from the measurement probe impinges on the measurement surface after traveling across the measurement standoff,

wherein the mass flow sensor senses a difference between the reference standoff and the measurement standoff.

48. The system of claim 46, further comprising:

a mass flow rate controller positioned before the dividing portion.

49. The system of claim 48, further comprising:

a snubber located after the mass flow controller to reduce gas turbulence.

50. The system of claim 46, wherein the nozzle orifice has a height H which is larger than a width W.

51. The system of claim 46, wherein:

the nozzle orifice has a height H and a width W; and

a ratio of H to W is between about 2:1 to about 20:1.

52. The system of claim 46, wherein:

the nozzle orifice has a height H and a width W; and

a ratio of H to W is about 10:1.

## *IX. Evidence Appendix*

None.

## *X. Related Proceedings Appendix*

None.